



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11) EP 0 872 692 A1

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:

21.10.1998 Bulletin 1998/43

(51) Int. Cl.<sup>6</sup>: F24C 15/02

(21) Application number: 97202290.9

(22) Date of filing: 22.07.1997

(84) Designated Contracting States:

AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC  
NL PT SE

Designated Extension States:

AL LT LV RO SI

(30) Priority: 18.04.1997 IT MI970278 U

(71) Applicant:

FARINGOSI HINGES S.r.l.  
Milano (IT)

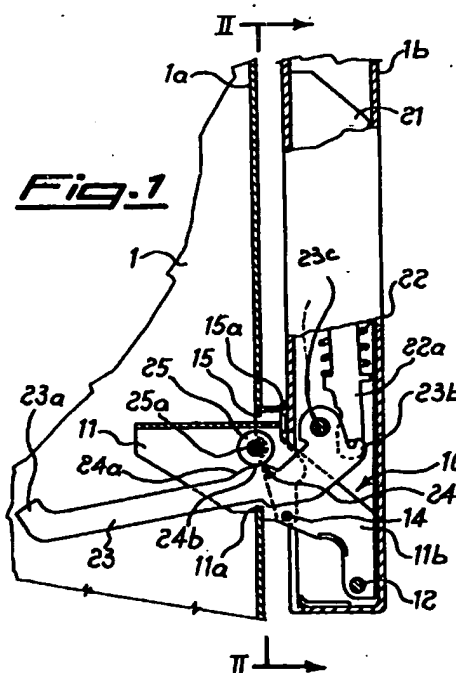
(72) Inventor: Faringosì, Alvaro  
Milano (IT)

(74) Representative:

Raimondi, Alfredo, Dott. Ing. Prof. et al  
Dott. Ing. Prof. RAIMONDI ALFREDO S.r.l.  
Piazzale Cadorna 15  
20123 Milano (IT)

(54) Hinge for furniture and the like, with movable arm arranged inside the fixed arm

(57) Hinge for connecting doors (1b) to ovens (1, 1a) and the like, which comprises a fixed arm (11) engageable with the body of the oven, a movable part (21) which is hinged on said fixed arm (11) and on which one end (23b) of a movable arm (23) is pivotally mounted, there being provided means (15) for fastening the movable arm (23) to the fixed arm (11), said fixed arm (11) having a cross-section in the form of an upturned "U", between the walls of which there is arranged an idle roller (25), and said movable arm (23) being arranged inside said fixed arm.



EP 0 872 692 A1

## Description

The present invention relates to a hinge for connecting doors to associated ovens and the like, which comprises a fixed arm engageable with the body of the oven and integral with the movable hinge part fixed to the door, which fixed arm has a cross-section in the form of an upturned "U" which has arranged inside it a movable arm in turn pivotably mounted on said movable hinge part.

It is known in the technical sector relating to the production of hinges for connecting the doors closing ovens, electric household appliances, furniture and the like, of the need for manufacturing said hinges as two parts, one of which is integral with the oven or like and the other integral with the door for closing the same, so that it is possible to arrange the said door in stable positions where it is closed, partially open for ventilating the oven during cooking with the spit, or totally open, as well as in a stable position where it is possible to separate the door, together with its hinge part, from the oven, while ensuring safety conditions which prevent injury to the user.

Hinges designed to solve these problems are known, for example, from IT-174,447 in the name of the same Applicant, which describes a hinge with a fixed pivoting arm for joining door and oven and a movable arm integral with the door and movable with the latter.

While solving the aforementioned technical problem, these hinges have the drawback, however, of leaving the movable arm above the fixed arm with the consequent need for providing special configurations of the said arms designed to prevent trapping of the operator's fingers, this requiring consequent over-dimensioning of the various parts with an obvious increase in the volume, weight and overall costs of the hinge.

In addition to this, the manufacturers require, for aesthetic reasons, that this upper movable arm should not remain visible during partial or total opening of the door.

Hinges are also known, in which this upper movable arm has been eliminated, thus solving the problem relating to the visible presence and extension thereof, but giving rise at the same time to problems relating to balancing and operation of the hinge, resulting in the need to insert inside the body thereof a second hinge, acting under compression, in addition to the conventional spring acting by means of extension in order to counterbalance the weight of the door, thus resulting in a notable increase in the longitudinal dimensions of the hinge itself, but nevertheless not providing any guarantee as regards control of tilting of the door during opening, since no mechanical end-of-travel stops are provided for the opening movement itself.

The technical problem which is posed, therefore, is that of providing a hinge for the doors of ovens, electric household appliances, furniture and the like, which allows said door to be positioned in various stable open

positions, allows easy and safe separation of the door from the body of the oven or the like and, at the same time, does not have a movable arm which is visible.

Within the scope of this problem a further need is that said hinge should have limited dimensions, be easy and economical to assemble and applicable also to doors of the known type without particular special adaptations of either part.

These technical problems are solved according to the present invention by a hinge for connecting doors to ovens and the like, which comprises a fixed arm engageable with the body of the oven, a movable part which is hinged on said fixed arm and on which one end of a movable arm is pivotably mounted, there also being provided means for fastening the movable arm to the fixed arm, said fixed arm having a cross-section in the form of an upturned "U", between the walls of which there is arranged an idle roller, and said movable arm being arranged inside said fixed arm.

Further details may be obtained from the following description of a non-limiting example of embodiment of the invention provided with reference to the accompanying figures, in which:

- 25 Figure 1 shows a cross-section along the plane indicated by I-I in Fig. 2 of the hinge according to the invention applied to a door in the closed position of the oven;
- 30 Figure 2 shows a cross-section along the plane indicated by II-II in Fig. 1;
- Figure 3 shows a partially sectioned side view of the hinge according to Fig. 1 in the partially open position;
- 35 Figure 4 shows a partially sectioned side view of the hinge according to Fig. 1 in the totally open position;
- 40 Figure 5 shows a partially sectioned side view of the hinge according to Fig. 1 in the position pulled out from the oven body; and
- 45 Figure 6 shows a cross-section similar to that of Fig. 1, illustrating an example of a variant for fixing the hinge to the door in the longitudinal direction instead of the transverse direction.
- 50

As illustrated, the hinge according to the invention is arranged between the body 1a of an oven 1 and the door 1b for closing the same.

The hinge has a fixed part 10 comprising an arm 11 with an elbow bend and a cross-section substantially in the form of an upturned "U"; said arm has in its bottom part a recess 11a designed to be coupled with a corresponding projection of the oven wall with which it

engages.

At the opposite end 11b outside the oven, the arm 11 has a pin 12 with a substantially horizontal axis which forms the axis of rotation of the hinge and on which the body 21 of the movable part of the hinge itself is hinged; said body 21 has a cross-section in the form of a "C" and houses inside it a spring 22 acting under compression on an associated support 22a which in turn acts on one end 23b of a movable arm 23 rotating on a horizontal idle pin 23c arranged between the two walls of the "U".

The other end of the movable arm 23 is free and shaped in the manner of a hook 23a designed to engage with a roller 25 mounted idle on a horizontal pin 25a arranged inside the fixed arm 11 between the two walls of the "U".

On its upper surface the movable arm 23 also has a relief 24 with inclined sides 24a, which is designed to come into contact with said roller 25 so that the interference between the upper surface 24b of the relief and the roller 25 produces a predetermined contrasting action such that a certain degree of force is required in order to open the oven door; similarly the contact of the inner side 24a against the same roller 25 is designed to cause a braking action of the door in the partially open position for cooking with the spit as described further below with reference to operation of the hinge.

The external bottom surface of the fixed arm 11 (Fig. 5) is also provided with a pin 14 on which one end of lever 15 is hinged, the other end of said lever having a tongue 15a designed to be inserted in abutment against a corresponding seat 23b of the movable arm 23; as will emerge more clearly further below with reference to operation of the hinge, this lever 15 enables the movable arm 23 to be made integral with the fixed arm 11 for pulling out the door from the oven body.

Operation of the hinge is as follows:

- when the door 1b is in the closed condition (Fig. 1), the particular configuration of the relief 24 of the arm 23 ensures the necessary force for pushing the door against the contact seal of the oven so that no heat escapes from the oven;
- by partially opening the door 1a (Fig. 3) it is possible to bring the movable arm 23 into a position such that the roller 25 rests on the internal side 24a of the projection 24, counterbalancing the thrusting force component of the spring 22 and thus keeping the partially open position of the door stable, which is particularly useful in the case of cooking with the spit;
- when the door 1b is fully opened (Fig. 4), the movable arm 23 brings its free hook-shaped end 23a against the roller 25, thus acting as an end-of-travel safety stop against tilting of the door itself;

- finally, as illustrated in Fig. 5, it is possible to open the door at a suitable angle which allows the operator to rotate the lever 15 in a clockwise direction so as to engage the tongue 15a into the seat 23b of the movable lever 23 and cause fastening of the movable arm itself with the fixed arm 11; in this condition it is therefore possible to separate the door 1b from the body 1a of the oven since the fixed arm may be disengaged from its anchoring seat and pulled out integrally with the movable arm without the risk of sudden movements of the hinge due to the spring 22 and prevented by the opposing action of the lever 15.

It is therefore obvious how the hinge according to the invention allows perfect and complete operation of a hinge with a movable arm to be maintained, ensuring a uniform and reliable closing action of the door over time, balanced opening and control of the tilting movement of the door, but without the movable arm being visible and without the dimensions of the hinge being altered, thereby making it possible to use the hinge according to the invention in place of hinges of the conventional type, without the need for substantial variations of the various component parts and the walls of the oven and the door.

In addition to this, it is also possible to eliminate the roller support element which, in conventional hinges, consisted of an additional body to be fastened to the body of the oven, while in the present invention it is an integral part of the hinge.

Finally, and as illustrated in Fig. 6, it is also possible to provide the hinge with a base plate 21a for closing the body 21 of the hinge in the transverse direction; this base plate has formed in it a threaded hole 21b suitable for engagement with a corresponding screw 30, the head 30a of which reacts against the bottom surface 1c of the door 1b.

In this way it is possible to provide a fastening system with means arranged parallel to the plane of the door 1b and hidden from the user's sight with obvious practical advantages during assembly and aesthetic advantages during use.

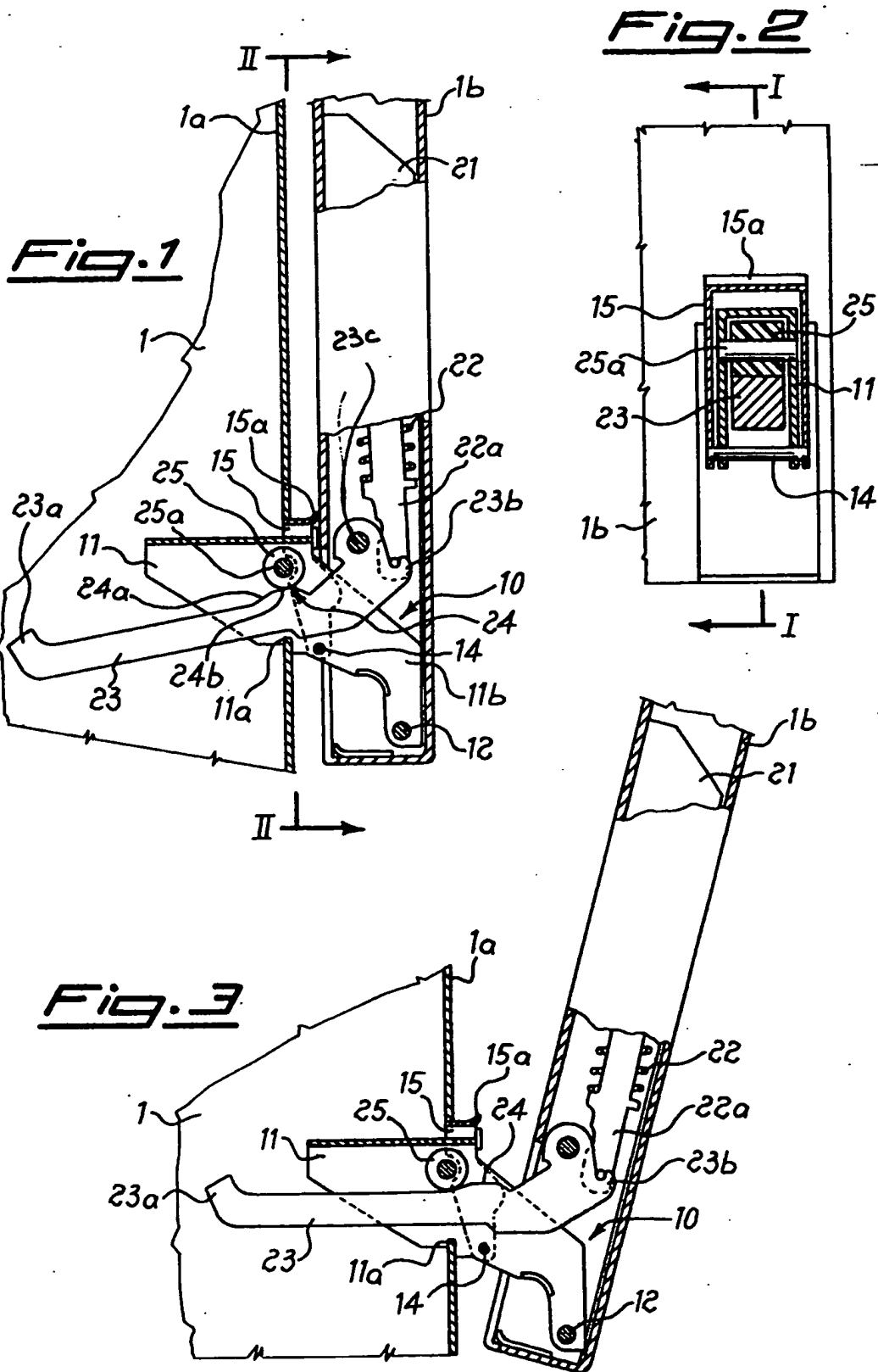
In all its embodiments the hinge is also designed to prevent accidental introduction of the fingers, especially by children, between the two arms of the hinge itself.

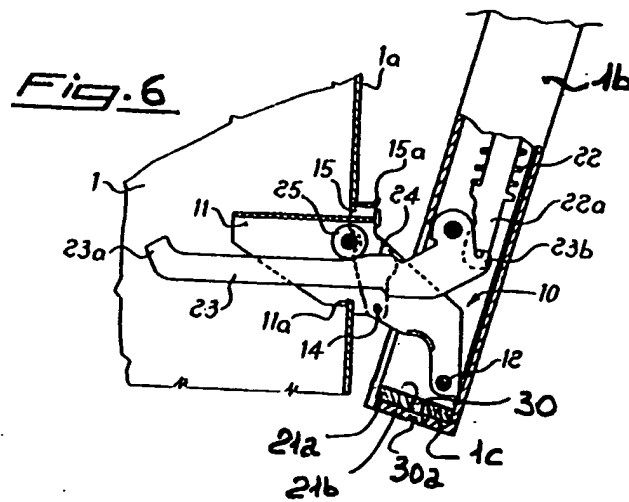
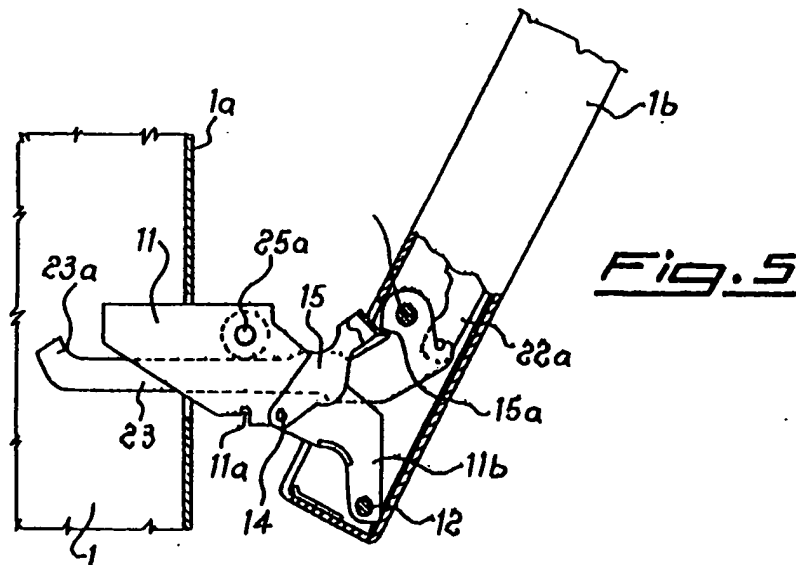
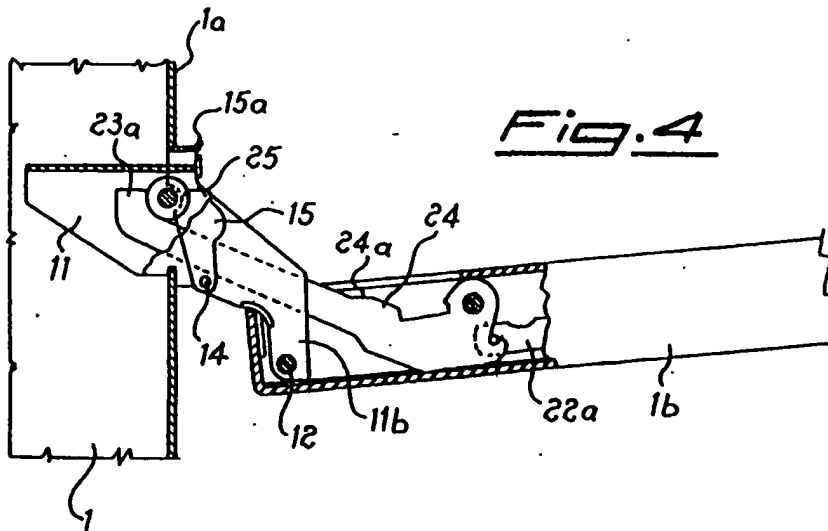
#### Claims

1. Hinge for connecting doors (1b) to ovens (1,1a) and the like, which comprises a fixed arm (11) engageable with the body of the oven, a movable part (21) which is hinged on said fixed arm (11) and on which one end (23b) of a movable arm (23) is pivotally mounted, there being provided means (15) for fastening the movable arm (23) to the fixed arm (11), characterized in that said fixed arm (11) has a cross-section in the form of an upturned "U".

between the walls of which there is arranged an idle roller (25) and in that said movable arm (23) is arranged inside said fixed arm.

2. Hinge according to Claim 1, characterized in that said movable arm (23) has a free hook-shaped end (23a) for engagement with the said roller (25) integral with the fixed arm. 5
3. Hinge according to Claim 1, characterized in that the upper surface of the movable arm is provided with a projection (24) designed to cooperate with said roller (25) so as to retain the door of the oven against the recall action of a spring (22) integral with the movable part (21). 10 15
4. Hinge according to Claim 1, characterized in that said projection (24) has a substantially flat upper surface (24b) and at least one inclined side (24a). 20
5. Hinge according to Claim 1, characterized in that said flat upper surface (24b) cooperates with said roller (25) so as to produce a recall force during closing of the door (1b). 25
6. Hinge according to Claim 1, characterized in that said side (24a) of the projection (24) cooperates with the fixed roller (25) so as to counterbalance the thrusting action of the spring (22) and produce a partially open position of the door. 30
7. Hinge according to Claim 1, characterized in that said means for relative fastening of movable arm and fixed arm consist of a lever (15) hinged on a pin (14) arranged on the bottom edge of the fixed arm (11). 35
8. Hinge according to Claims 1 and 7, characterized in that said lever (15) has a free end shaped in the manner of a tongue (15a) designed to be inserted into a corresponding seat (23b) of the movable arm (23). 40
9. Hinge according to Claim 1, characterized in that it has means (21b, 21c) for fixing to the door (1b) of the oven, the axes of action of which lie in a plane parallel to the door (1b) itself. 45
10. Hinge according to Claims 1 and 9, characterized in that said fixing means consist of a base plate (21a) for closing the body (1b) of the hinge in the transverse direction, this base plate having formed in it a threaded hole (21b) suitable for engagement with a corresponding screw (30), the head (30a) of which reacts against the bottom surface (1c) of the door (1b). 50 55







European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 97 20 2290

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 738 817 A (FARINGOSI HINGES) 23 October 1996 * column 2, line 22 - column 3, line 10; figure 1 *	1-8	F24C15/02
A	US 3 123 064 A (HARTSON) 3 March 1964 * column 3, line 37 - line 47; figures 1-5 *	1-5,7,8	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F24C
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>29 May 1998</b>	Examiner <b>Guillaume, G</b>
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/82 (P4/C01)

**DERWENT-ACC-NO: 1998-534021**

**DERWENT-WEEK: 200203**

**COPYRIGHT 1999 DERWENT INFORMATION LTD**

**TITLE: Oven door hinge - has pivoted hinged fixed arm  
and  
movable arm arranged inside fixed arm**

**INVENTOR: FARINGOSI, A**

**PATENT-ASSIGNEE: FARINGOSI HINGES SRL[FARIN]**

**PRIORITY-DATA: 1997IT-MI00278 (April 18, 1997)**

**PATENT-FAMILY:**

<b>PUB-NO</b>	<b>PUB-DATE</b>	<b>LANGUAGE</b>	<b>PAGES</b>
<b>MAIN-IPC</b>			
<b>EP 872692 A1</b>	<b>October 21, 1998</b>	<b>E</b>	<b>007</b>
<b>F24C 015/02</b>			
<b>ES 2161414 T3</b>	<b>December 1, 2001</b>	<b>N/A</b>	<b>000</b>
<b>F24C 015/02</b>			
<b>CA 2211348 A</b>	<b>October 18, 1998</b>	<b>N/A</b>	<b>000</b>
<b>E05D 007/00</b>			
<b>US 5937481 A</b>	<b>August 17, 1999</b>	<b>N/A</b>	<b>000</b>
<b>E05D 011/10</b>			
<b>EP 872692 B1</b>	<b>August 22, 2001</b>	<b>E</b>	<b>000</b>
<b>F24C 015/02</b>			
<b>DE 69706278 E</b>	<b>September 27, 2001</b>	<b>N/A</b>	<b>000</b>
<b>F24C 015/02</b>			

**DESIGNATED-STATES: AL AT BE CH DE DK ES FI FR GB GR IE IT LI**



**LT LU LV MC NL PT**

**RO SE SI AT BE CH DE DK ES FI FR GB GR IE IT LI LU NL PT RO SE  
SI**

**APPLICATION-DATA:**

<b>PUB-NO</b>	<b>APPL-DESCRIPTOR</b>	<b>APPL-NO</b>	
<b>APPL-DATE</b>			
<b>EP 872692A1</b>	<b>N/A</b>	<b>1997EP-0202290</b>	<b>July 22,</b>
<b>1997</b>			
<b>ES 2161414T3</b>	<b>N/A</b>	<b>1997EP-0202290</b>	<b>July 22,</b>
<b>1997</b>			
<b>ES 2161414T3</b>	<b>Based on</b>	<b>EP 872692</b>	<b>N/A</b>
<b>CA 2211348A</b>	<b>N/A</b>	<b>1997CA-2211348</b>	<b>July 24,</b>
<b>1997</b>			
<b>US 5937481A</b>	<b>N/A</b>	<b>1997US-0902675</b>	<b>July 30,</b>
<b>1997</b>			
<b>EP 872692B1</b>	<b>N/A</b>	<b>1997EP-0202290</b>	<b>July 22,</b>
<b>1997</b>			
<b>DE 69706278E</b>	<b>N/A</b>	<b>1997DE-0606278</b>	<b>July 22,</b>
<b>1997</b>			
<b>DE 69706278E</b>	<b>N/A</b>	<b>1997EP-0202290</b>	<b>July 22,</b>
<b>1997</b>			
<b>DE 69706278E</b>	<b>Based on</b>	<b>EP 872692</b>	<b>N/A</b>

**INT-CL (IPC): E05D007/00, E05D011/10 , F24C015/02**

**ABSTRACTED-PUB-NO: EP 872692A**

**BASIC-ABSTRACT:**

**The hinge connects an oven door(1b) to an oven (1,1a) where the hinge has a fixed arm (11)engaging with the body of the oven (1, 1a). A body**

**(21) is  
hinged on the fixed arm, with one end (23b) of a movable arm (23)  
being  
pivoted. The arm is part of a fixed part (10) with the arm having a  
recess  
(11a) for coupling to the oven wall.**

**At the opposite end of the oven, the arm has a pin (12) on which  
the body of  
the hinge is hinged. The body is C-shaped and houses a spring (22)  
which acts  
on the end of the arm. The free end of the arm is shaped as a hook  
(23a) which  
engages a roller (25) on a pin (25a) inside the fixed arm.**

**ADVANTAGE - Allows the door to be safely positioned in various  
stable open  
positions.**

**ABSTRACTED-PUB-NO: EP 872692B**

**EQUIVALENT-ABSTRACTS:**

**The hinge connects an oven door(1b) to an oven (1,1a) where the  
hinge has a  
fixed arm (11)engaging with the body of the oven (1, 1a). A body  
(21) is  
hinged on the fixed arm, with one end (23b) of a movable arm (23)  
being  
pivoted. The arm is part of a fixed part (10) with the arm having a  
recess  
(11a) for coupling to the oven wall.**

**At the opposite end of the oven, the arm has a pin (12) on which  
the body of  
the hinge is hinged. The body is C-shaped and houses a spring (22)**

**which acts  
on the end of the arm. The free end of the arm is shaped as a hook  
(23a) which  
engages a roller (25) on a pin (25a) inside the fixed arm.**

**ADVANTAGE - Allows the door to be safely positioned in various  
stable open  
positions.**

**US 5937481A .**

**The hinge connects an oven door(1b) to an oven (1,1a) where the  
hinge has a  
fixed arm (11)engaging with the body of the oven (1, 1a). A body  
(21) is  
hinged on the fixed arm, with one end (23b) of a movable arm (23)  
being  
pivoted. The arm is part of a fixed part (10) with the arm having a  
recess  
(11a) for coupling to the oven wall.**

**At the opposite end of the oven, the arm has a pin (12) on which  
the body of  
the hinge is hinged. The body is C-shaped and houses a spring (22)  
which acts  
on the end of the arm. The free end of the arm is shaped as a hook  
(23a) which  
engages a roller (25) on a pin (25a) inside the fixed arm.**

**ADVANTAGE - Allows the door to be safely positioned in various  
stable open  
positions.**

**CHOSEN-DRAWING: Dwg.1/6**

**TITLE-TERMS: OVEN DOOR HINGE PIVOT HINGE FIX ARM MOVE**

**ARM ARRANGE FIX ARM**

**DERWENT-CLASS: Q47 Q74 X27**

**EPI-CODES: X27-C02;**

**SECONDARY-ACC-NO:**

**Non-CPI Secondary Accession Numbers: N1998-416672**